

## C.1 Operational Information Requirements

### 1.1 The Existing Galway Waste Water Works

The Galway City sewer network has expanded with the development of the city, and the oldest sewers can be found in city centre areas, where a mainly combined sewer system exists. Urban development spread east and west from the city centre, either side of the River Corrib, where construction has consisted mainly of separate sewer systems in the past twenty years.

The existing WWTP occupies most of the western part of Mutton Island and is connected to the mainland by a causeway. Within the causeway lies a main sewer, which delivers raw sewage to the WWTP for treatment. The treated effluent is discharged into the sea approximately 400m to the south of the island via an outfall pipe equipped with diffusers. This is the Primary Discharge point from the Agglomeration.

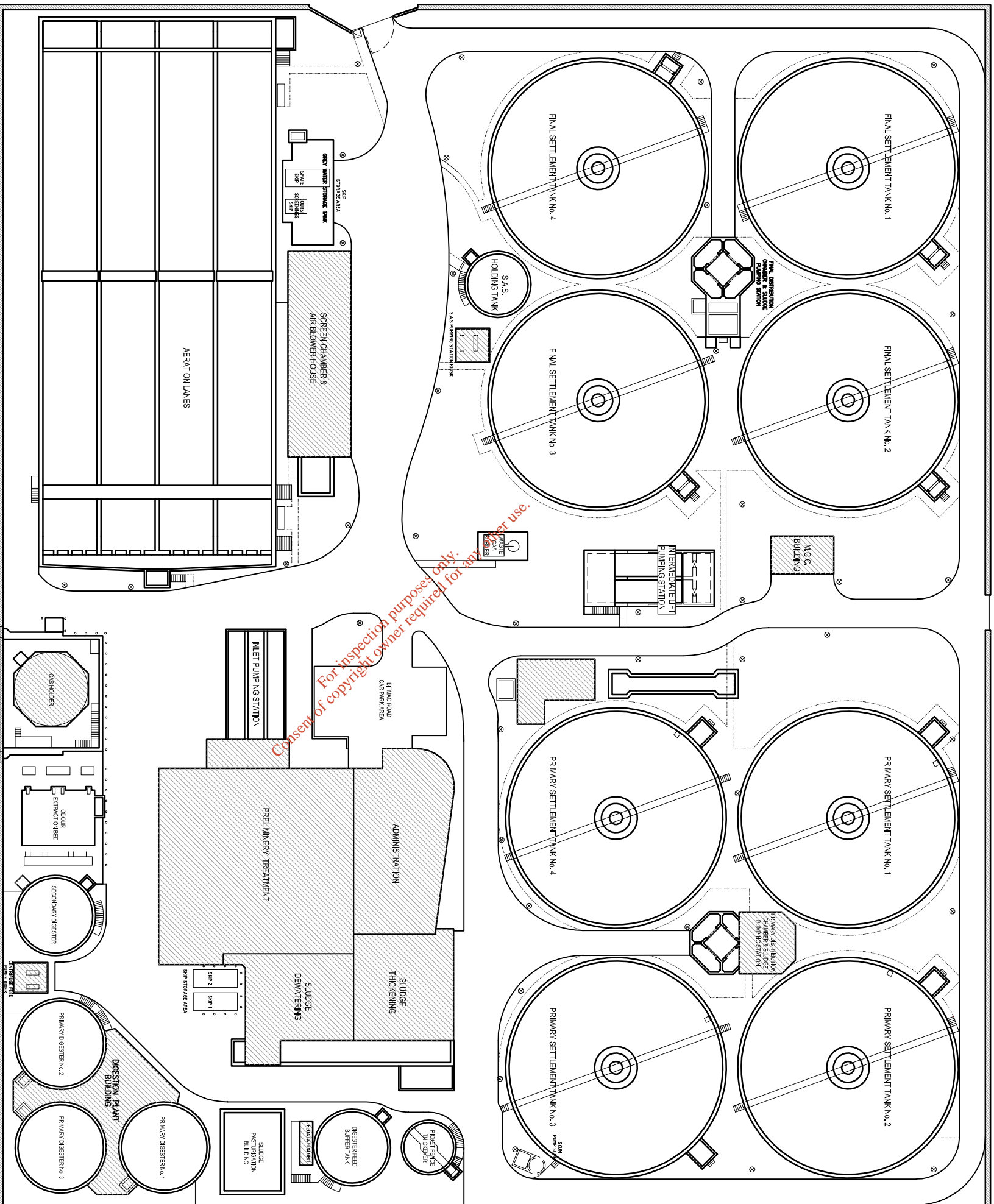
The Plant is operated by Earthtech Ireland Ltd. under a temporary Operation & Maintenance contract, with 24 hour supervision provided. Effluent flows and parameters are monitored, sampled and analysed on site, as detailed in Attachments C1 and E2.

Most areas of the City drain by gravity to the Mutton Island WWTP, where wastewater receives secondary treatment. All flows from the east of the City cross the River Corrib Estuary via dual siphons, before joining flows from the west of the City at the 1800mm diameter sewer in the causeway to the WWTP. There are ten pumping stations in the City sewer network; two of these pumping stations are located west of the River Corrib, with the remainder on the East side of the River.

Wastewater from the Galway County areas of Parkmore, Oranmore and Barna is also treated at the Mutton Island WWTP. The rising main carrying effluent from Barna discharges to the main drainage network at Cappagh Road, on the western fringe of the City, while the wastewater from the Parkmore area, to the north east of the City, is discharged by gravity into the City network. Wastewater from Oranmore is pumped via rising main to discharge into the City main drainage network at Wellpark.

There are fifteen secondary discharges throughout the Agglomeration, two of which are located at the WWTP. Five of the discharge points serve pumping station emergency overflows, two of the discharges are from defective combined storm overflows (CSOs), and the remainder are from combined sewers which are unconnected to the main drainage network.

The two secondary discharges at the WWTP are located on the west shore of Mutton Island. The first of these only operates in the event of a pump failure in the wet well of the outfall

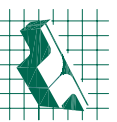


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3. ENGINEER TO BE INFORMED BY THE CONTRACTOR OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES
4. ALL LEVELS SHOWN RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD



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Client: Comhairle Cathrach na Gallimhe  
**Galway City Council**

Project: **EPA WASTE WATER DISCHARGE LICENCE APPLICATION**

Title: **PLANT/PROCESS SITE PLAN**

Prepared by: A.M.

Checked: I.M.

Date: Dec 07

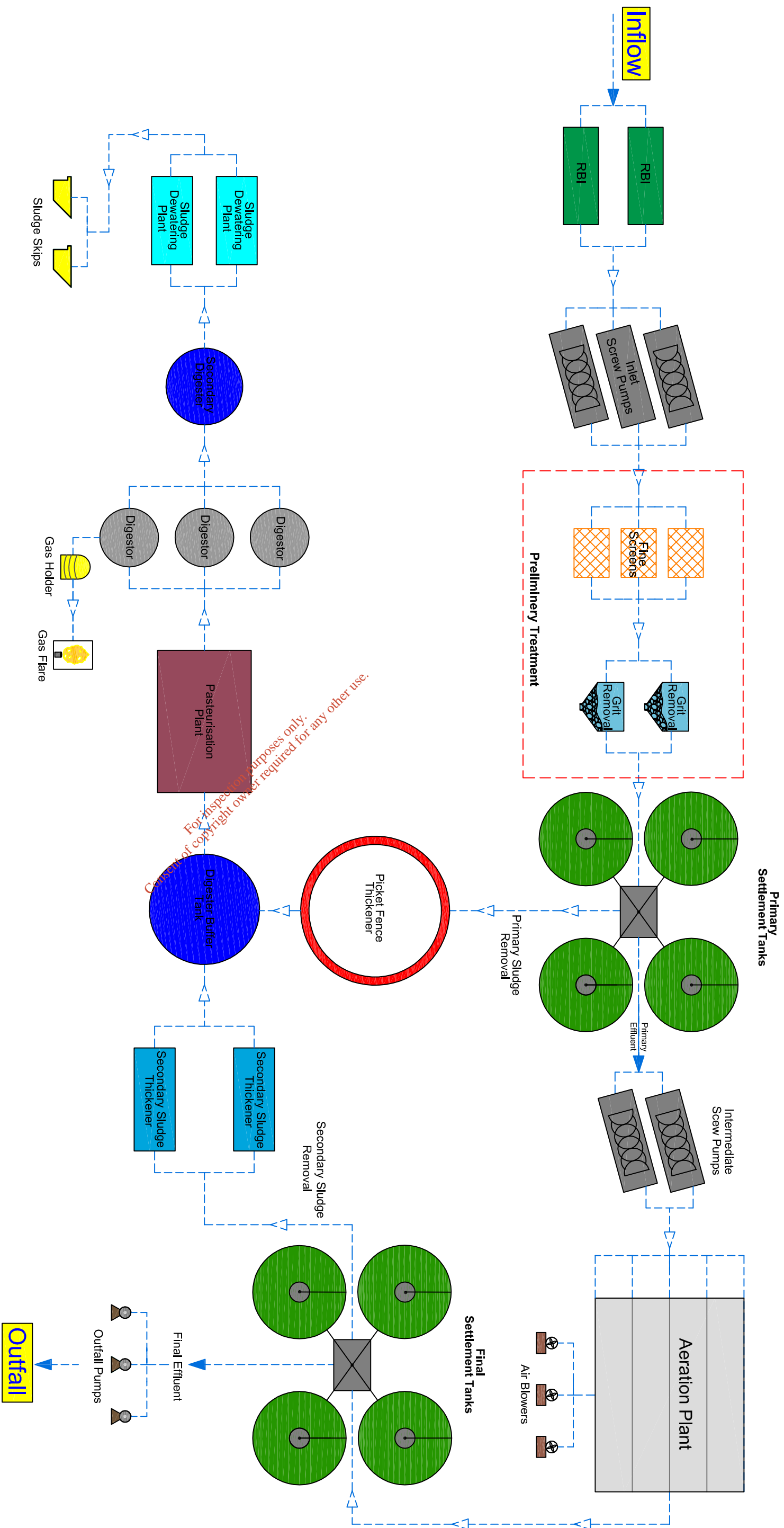
Project Director: P. J. Fogarty

Scale @ A3: N.T.S

Issue	Date	Description	By	Chkd.
A	Dec 07	FIRST ISSUE	A.M.	I.M.

Drawing No.: **2148-2619**  
 Attachment No.: **C1**

Issue: **A**

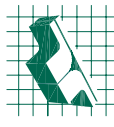



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Project:	EPA WASTE WATER DISCHARGE LICENCE APPLICATION	Date:	Dec '07	Date:	Dec '07	Issue:	Dec '07	L.M.	
Title:	PROCESS FLOW DIAGRAM	Project Director:	P. J. Fogarty	Project Director:	P. J. Fogarty	Attachment No.:	2148-2620	By:	A.M.
		Scale @ A3:	N.T.S	Drawing No.:	2148-2620	Description:	FRST ISSUE	Chkd.	L.M.
				Attachment No.:	C1			Issue:	A

pumping station, while the second outfall discharges effluent (after screening) under storm conditions, thus preventing the WWTP from becoming overloaded.

There are currently nine CSO's in the Galway network, which spill at seven storm water overflow discharge points. The operating regimes and construction details of these CSO's and the discharges above are outlined in Attachment C1.

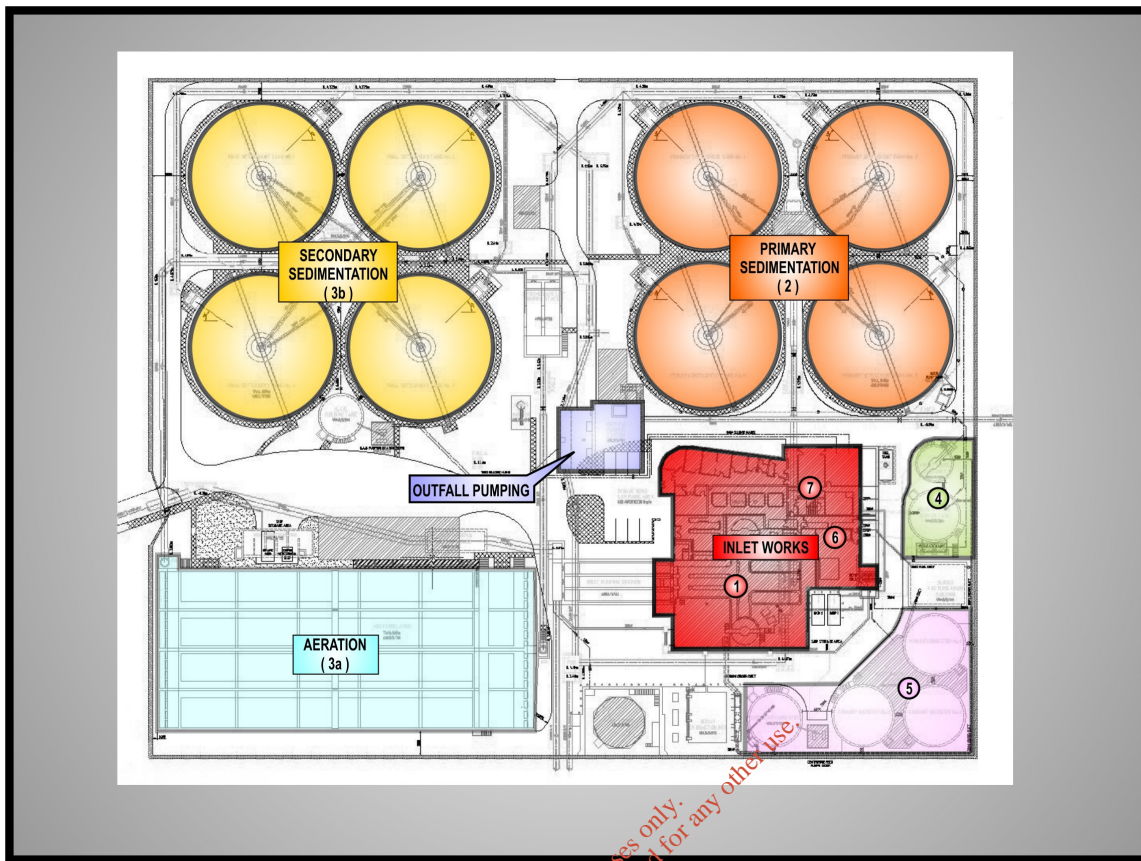
## 1.2 Mutton Island WWTP

The existing operating system at the Mutton Island WWTP is illustrated in Figure 1 below, and in Attachment C1, Drawing No. 2148-2619.

The main elements of the treatment works units at Mutton Island WWTP are as follows:

- inlet works (incorporating screw pumps, fine screens and grit removal) (1);
- primary sedimentation tanks (2);
- an activated sludge plant, incorporating aeration tanks (3a) and final settlement tanks (3b);
- sludge holding tanks (4);
- a sludge digestion plant (5);
- sludge dewatering (6); and
- a Control and Administration Building (7).

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**Figure 1 - Mutton Island Site Plan**

All flows to Mutton Island WWTP arrive at the inlet sump, via gravity, through an 1800mm diameter trunk sewer laid in the causeway. Flows up to 6DWF arriving at the treatment plant, are pumped via Screw Pumps to Preliminary Treatment, consisting of screening and grit removal. At this point, flows in excess of 6DWF bypass the plant via a 1200mm diameter overflow pipe to the West Shore of Mutton Island (Secondary Discharge, SD 02).

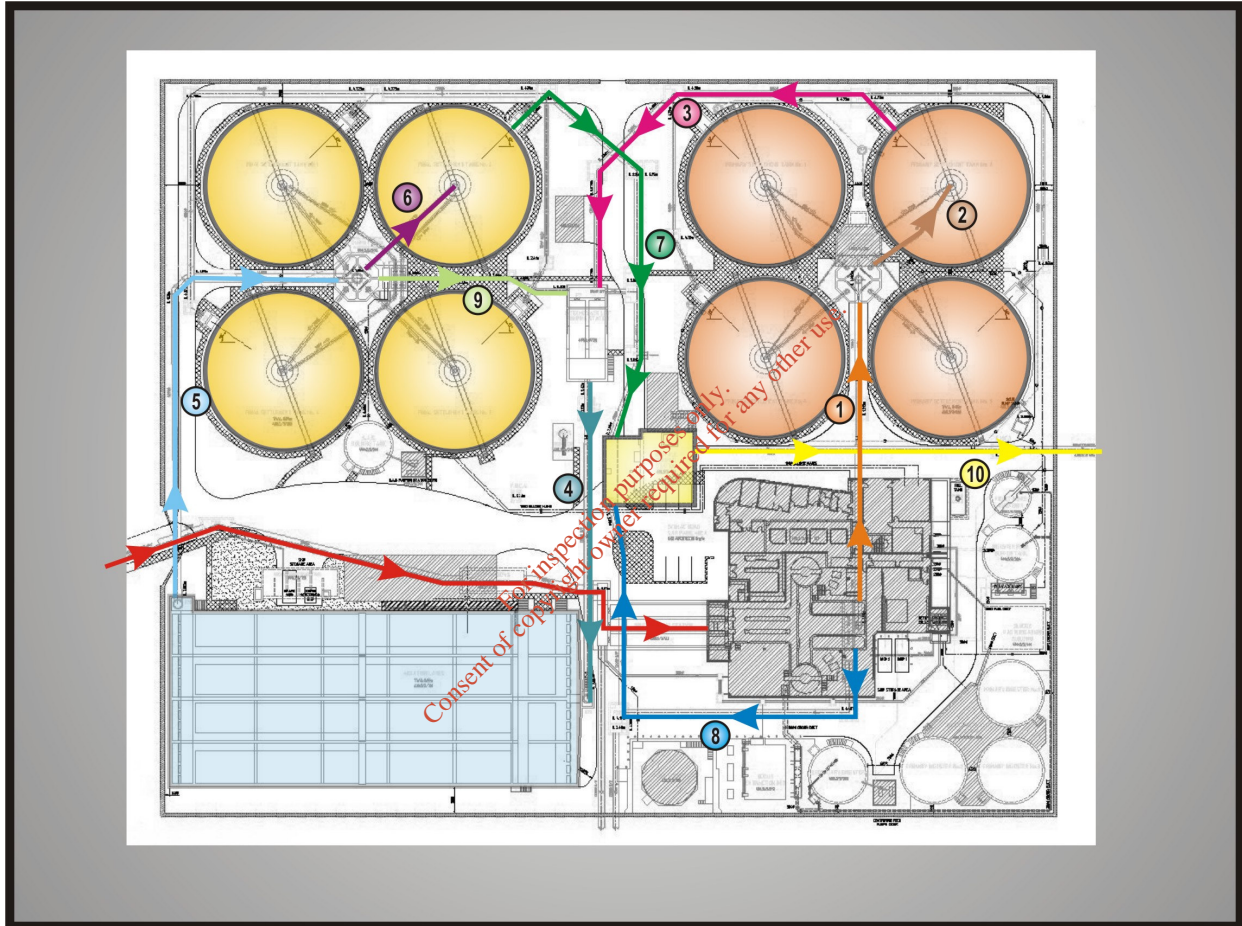
An overflow channel arrangement at the end of the Preliminary Units allows flows up to 3DWF to advance for full treatment, and these flows are recorded by a flow monitor. Flows in excess of 3DWF overflow to the outfall wet well and discharge to sea with the treated effluent. The treated effluent from the works flows through a 900mm diameter HDPE outfall pipeline and discharges to the sea via a 100m long diffuser section, located some 400 metres south of Mutton Island (PD 01). Flows to the sea diffuser are monitored by the outlet flow monitor.

In relation to the inlet sump, the frequency or volumes of overflows are unknown. Overflows from the inlet sump will occur either because no flow is being accepted at the works (inlet pump failure) or due to the flows being higher than the design flows.

In relation to overflows at the outlet sump, under normal operating conditions, all flows under 6DWF should pass through the outlet pumping station to the sea diffuser. However, when the

outlet sump pumps are not operating as designed, and there is a high tide, treated flows can possibly bypass the outlet pumping station and discharge to the west shore of Mutton Island via a second 1200mm diameter overflow pipe, without any flow monitoring (Secondary Discharge, SD 01).

A breakdown of the interconnecting pipework into essential hydraulic components is shown on Figure 2.



**Figure 2 - Interconnecting Pipes**

The interconnecting pipes are:

1. from inlet works to primary sedimentation flow divider
2. from primary sedimentation flow divider to primary sedimentation
3. from primary sedimentation to intermediate pumping station
4. from intermediate pumping station to aeration tank
5. from aeration tank to final sedimentation flow divider
6. from final sedimentation flow divider to final sedimentation
7. from final sedimentation to outfall pumping station
8. from inlet works to outfall pumping station

9. from return activated sludge chamber to intermediate pumping station
10. from outfall pumping station to sea diffuser (PD 01)

Screened and degritted wastewater is first brought in a single pipe to the Primary Sedimentation Stage Flow Divider Chamber, which evenly splits the flow between the four Primary Sedimentation Tanks, each of which accepts one quarter along its inlet pipework.

Each Primary Sedimentation Tank decants via the weir overflow and discharges to the intermediate pumping station, where it is lifted into the aeration tanks. At that point, the Return Activated Sludge (RAS) flow joins the forward process flow. Outflow from the aeration stage is again in a common pipe to the Final Sedimentation Stage Flow Divider Chamber, where again it is partitioned equally between the four Final Clarifiers. Outflow from these Clarifiers is discharged to sea via the Outfall Diffuser.

### 1.3 Waste Water Works

The discharges in the waste water works are illustrated in the drawings included in Attachment C2.

#### 1.3.1 *Emergency Overflow from Gentian Hill Pumping Station (SD 03)*

Should the inlet chamber surcharge an overflow will operate through a manually raked screen to adjacent storm overflow tanks. These were originally marine discharge tanks controlled by a lunar clock. These tanks, which can be penstock controlled to operate independently, discharge to an adjacent wet well. Two submersible pumps in this wet well return the sewage to the foul wet well when it is no longer surcharged. Should the foul wet well remain surcharged the storm tanks will eventually overflow through the old 525mm diameter sea outfall pipe. It is considered that the foul wet well overflow to the storm tanks will not operate apart from power failure over an extended period.

#### 1.3.2 *Emergency Overflow from Parkavera Pumping Station (SD 04)*

This pumping station has two submersible pumps sited in the wet well. Designed to operate duty/assist it currently will not activate the second duty pump, and as such operates as a single duty pumping station. There is an emergency overflow provision to the adjacent river, which operates almost instantly following a malfunction of the pumps.

### ***1.3.3 Emergency Overflow from Merlin Park Pumping Station (SD 05)***

The 250mm diameter emergency overflow from this pumping station discharges to a 1500mm diameter surface water sewer, which eventually discharges into Galway Bay at Murrough. The rising main connects to the rising main from the Oranmore pumping station. Radio telemetry will stop the Oranmore pumps operating when the Merlin Park pumps are running. This is designed to utilise the substantial storage facility at Oranmore.

### ***1.3.4 Emergency Overflow from Oranmore Pumping Station (SD 06)***

Should the wet well at this pumping station surcharge a penstock on the flow into the wet well should close automatically and a penstock should automatically open and discharge the incoming flow to the storm tank. Should the storm tank surcharge an overflow operates through a fine mesh screen discharging through a 600mm diameter pipe to the sea. When the level in the wet well falls, a penstock between the storm tank and the wet well should open, discharging the contents of the storm tank back to the wet well. The penstocks controlling the inflow should reverse operation and the status quo should be reinstated.

### ***1.3.5 Emergency Overflow from Terryland Pumping Station (SD 07)***

Sewage enters an inlet chamber through a static bar screen at this pumping station, then through a penstock to the wet well. Should the wet well surcharge, flow passes over a weir in the inlet chamber, through a finer static bar screen, discharging to the storm tank. Return from the storm tank to the wet well is controlled by a manually operated penstock. Both bar screens are manually raked. Should the wet well remain surcharged the storm tank will eventually overflow through a bellmouth to a 300mm diameter overflow pipe, which discharges in the Terryland River. It is thought that an overflow from storm tank will not operate apart from power failure.

### ***1.3.6 Claddagh Quay CSO (SD 08)***

This CSO is located on Claddagh Quay, opposite St Mary's Church in The Claddagh. The incoming pipe in this CSO has a diameter of 1200mm and an invert level of 0.513m OD. The outgoing pipe is a much smaller 525mm diameter pipe at 0.393m OD. This has a 750x800mm manually operated penstock, currently set fully open, at the inlet of the pipe. The CSO is a stilling pond type overflow with the outgoing pipe causing a restriction resulting in flow backing up and spilling over a weir wall, which is square in shape. The weir wall also has a 20mm thick wooden scumboard set 150mm in front of its face.

The incoming pipe to the CSO, which should be enclosed until it is within the stilling pond chamber, appears to have been broken open. This has resulted in the top section of the pipe being removed and has therefore caused a new, lower point of spill into the overflow channel



compared to the weir wall. The overflow pipe at this CSO spills directly to the tidal River Corrib Estuary. The CSO is affected by high tides and storm surges.

### ***1.3.7 Lough Atalia CSO (SD 09)***

This CSO is located across from No. 98 Lough Atalia Road, on the banks of Lough Atalia. The incoming pipe to this CSO is a 300mm diameter pipe with an invert level of 2.013m OD. The outgoing pipe is also a 300mm diameter pipe and is at 1.973m OD. The CSO is a double low-sided weir type, with horizontal metal screens situated on top of the weir walls. The overflow pipe at this CSO spills directly to Lough Atalia. Because of the low level of the weir wall this CSO spills quite frequently.

### ***1.3.8 Unconnected Sewer at Dominick Street (SD 10)***

Effluent from all properties connected to the 375mm diameter combined sewer on Dominick St., discharges into the River Corrib at the Fisheries Museum behind Wolfe Tone Bridge.

### ***1.3.9 Unconnected Properties at Nun's Island (SD 11)***

There are 22 properties that are not connected to the sewer network in Nun's Island. These properties are mostly terraced houses, whose effluent drains through their backgardens and is discharged directly to the canal system. For reference purposes in this application, these have been included as an area secondary discharge.

### ***1.3.10 Unconnected Sewer at Earl's Island (SD 12)***

All but six holdings in the Earl's Island area are actually connected to a 450mm diameter combined sewer line. This line discharges directly to the Gaol Canal beside the Presbytery at the rear of the Cathedral grounds.

### ***1.3.11 Contaminated Surface Water Sewer at Dock Road (SD 13)***

The 600mm x 600mm Dock Road stormwater culvert, which discharges to the River Corrib Estuary at the end of Dock St., is contaminated with foul sewage. Three sources of this foul contamination have been identified;

1. There is a combined sewer connected to the culvert at Victoria Place.
2. A second 450mm diameter combined sewer is connected to the culvert at the junction of Dock St. and Bóthar na Long. This line takes effluent from the Enterprise Park, the Harbour Hotel and Cé na Mara apartments.
3. There is a combined sewer connected to the stormwater culvert at the junction of New Dock St., Dock St., and Dock Rd.

### ***1.3.12 Unconnected Properties at the Enterprise Park (SD 14)***

At present, effluent from the Harbour Masters' Office, the RNLI Boathouse, an adjoining warehouse and an office building discharges directly to the River Corrib Estuary, through a 150mm diameter sewer, adjacent to the RNLI Boathouse.

### ***1.3.13 Contaminated Surface Water Sewer at Long Walk (SD 15)***

CCTV survey work has found evidence of foul sewage in the 225mm diameter surface water pipe at the Long Walk, which outfalls directly to the River Corrib Estuary. Foul sewage contamination can also be seen in the water around the outfall. Three sources of this foul contamination have been identified:

1. A 150mm diameter foul line is connected to the stormwater line at Spanish Parade.
2. A 150mm foul line, taking sewage from an adjacent restaurant and an apartment building of 16 apartments, has been wrongly connected into the surface water line.
3. The stormwater line was once a combined outfall. The line was blocked off at the junction of Merchant's Road Lower and Spanish Parade when an interceptor sewer was built, draining to the river siphons, in 2000. The benching intended to isolate the sewers from one another, in a manhole on the combined 750mm diameter line on Spanish Parade, has deteriorated and effluent is leaking into the stormwater line.

### ***1.3.14 Kingston CSO (SWO 01)***

This CSO is located on Kingston Road near the junction with Shangort Road. The incoming and outgoing pipes in this CSO are 375mm in diameter at 12.22m and 12.20m OD respectively. The CSO is a double low-sided weir type, incorporating two 2.5m weir walls. The overflow spills to a surface water system, which discharges through an 1800mm diameter sewer to Rusheen Bay and eventually to Galway Bay.

### ***1.3.15 Grattan Road CSO (SWO 02)***

This CSO is located on Grattan Road near the junction with the Promenade in Salthill. The two main incoming pipes in this CSO are 1200mm and 800mm diameter at 0.151m and 0.158m OD respectively. The outgoing pipe is 1200mm in diameter with an invert level of 0.071m OD. The CSO is a high-level surcharge relief type. The overflow pipe spills to a surface water system, which discharges through a 750mm diameter sewer to Galway Bay, adjacent to Grattan Beach. The overflow level of this CSO would indicate that it is affected by high tides and storm surges. High tides in Galway generally range from 4.5m to 5.5m.

### ***1.3.16 Long Walk CSO (SWO 03)***

This CSO is located on The Long Walk alongside the River Corrib Estuary, near Galway City Centre, just upstream of the siphons which cross the Estuary. The incoming pipe to this CSO has a diameter of 1350mm and an invert level of 0.979m OD. The outgoing pipe is a 1350x780mm rectangular culvert and is also at 0.979m OD. The CSO is a double high-sided weir type at 1.859m OD. The overflow pipe at this CSO spills directly to the tidal River Corrib Estuary. The CSO is affected by high tides and storm surges.

### ***1.3.17 Newtownsmith CSO (SWO 04)***

This CSO is located adjacent to the Salmon Weir Bridge. This CSO is a surcharge relief type and is buried, and therefore pipe depths were estimated. There are two incoming pipes to this CSO, a 225mm diameter at a depth of 1.5m, and a 150mm diameter pipe at a depth of 1.42m. There are two outgoing pipes from the CSO, a 225mm diameter overflow pipe at a depth of 1.42m and a 225mm diameter pipe at a depth of 1.57m. The overflow pipe at this CSO spills directly to the River Corrib.

### ***1.3.18 Renmore Park and Dublin Road CSOs (SWO 05)***

The Renmore Park CSO is located opposite No. 6 Renmore Park in Renmore. There are two incoming pipes to this CSO, a 300mm diameter at 12.198m OD, and a 225mm diameter pipe at 12.298m OD. The outgoing pipe is a 300mm diameter pipe with an invert level of 12.188m OD. The CSO is a single 1.2m long low-sided weir type at 12.298m OD. The weir wall also has a horizontal metal screen on top of it. The overflow pipe at this CSO spills to a 225mm diameter overflow pipe, the same overflow pipe as the Dublin Road CSO, which discharges to Lough Atalia.

The Dublin Road CSO is located at the junction of Dublin Road and Renmore Park in Renmore. The incoming pipe to this CSO has a diameter of 300mm and an invert level of 11.438m OD. The outgoing pipe is a 450mm diameter pipe and is at 11.428m OD. The CSO is a double high-sided weir type, with two 1.84m weir walls. The overflow pipe at this CSO spills to the same overflow pipe as the Renmore Park CSO, which discharges to Lough Atalia.

### ***1.3.19 Moneenageisha CSO (SWO 06)***

This CSO is located to the rear of Moneenageisha Secondary School, off Wellpark Road, Wellpark. The incoming pipe to this CSO is a 525mm diameter pipe and has an invert level of 8.91m OD. The outgoing pipe is also 525mm and is at 8.87m OD. The CSO is a high-level surcharge relief type with two overflow pipes located within the chamber. One overflow pipe is a surcharge relief pipe, which spills flow into the combined sewer system, which runs parallel to

this system. This pipe is 225mm diameter at a level of 9.265m OD. The second overflow is a 360x300mm rectangular culvert at 9.245m OD, thus being the first point of spill. The overflow discharges to a surface water system, which eventually discharges to Lough Atalia through a 900mm diameter surface water sewer.

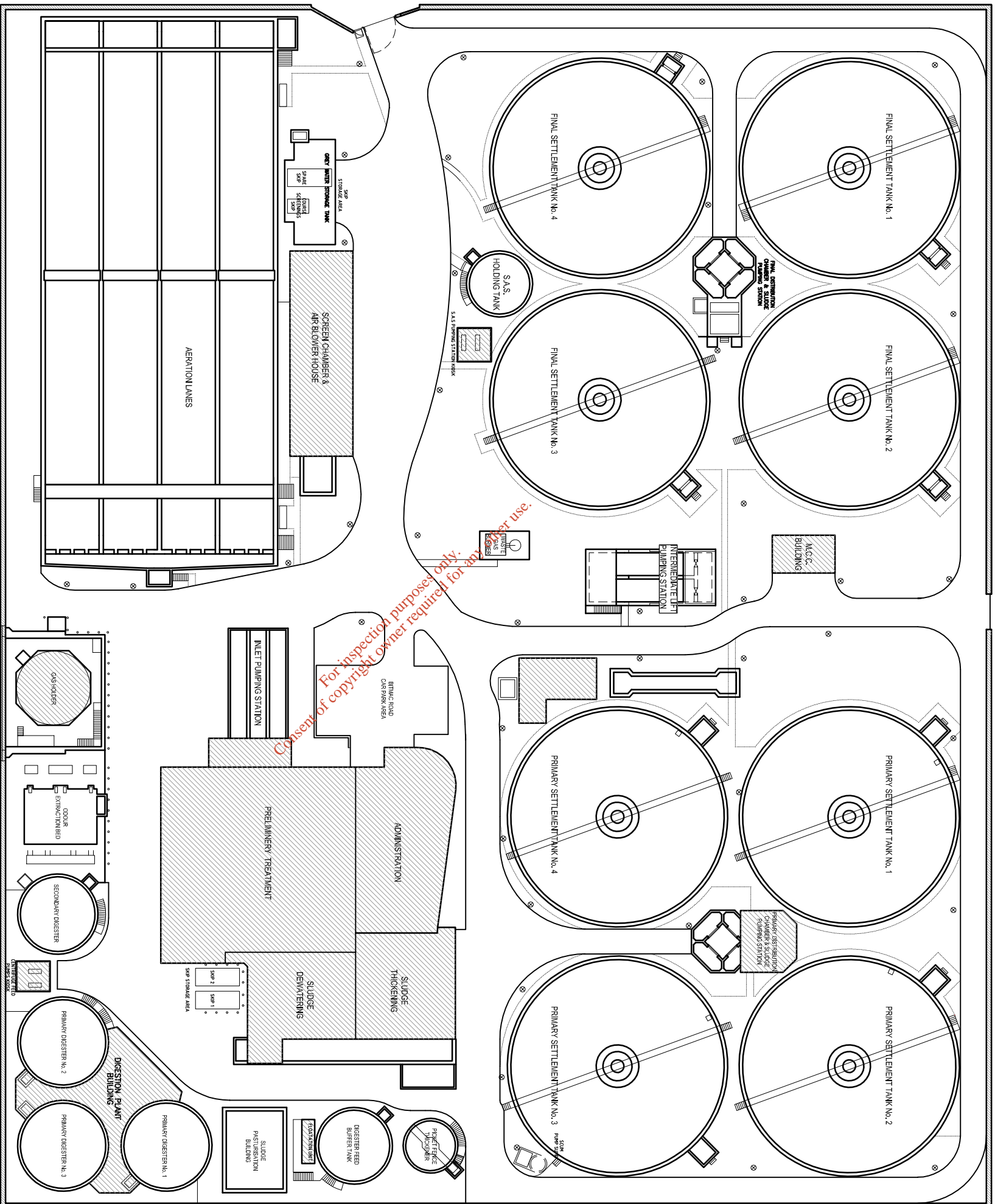
### *1.3.20 Michael Collins Road and Beach Avenue CSOs (SWO 07)*

The CSO located on Michael Collins Road, near the junction with Dublin Road, Mervue, has an incoming pipe which is 450mm in diameter, at a level of 19.118m OD. The outgoing pipe is also 450mm and is at the same level as the incoming pipe. The CSO is a double low-sided weir type, with two 1.23m long weir walls, which have horizontal metal screens located on top of them. The overflow pipe spills to a surface water system, which eventually discharges to Galway Bay through a 1350mm diameter sewer at Ballyloughane.

The CSO located on Beach Avenue in Renmore has 3 incoming pipes; a 300mm diameter pipe at 4.251m OD, a 225mm diameter pipe at 4.351m OD and a 150mm diameter pipe at 4.431m OD respectively. The outgoing pipe is 225mm and is at 4.171m OD. The CSO is a high-level surcharge relief type. The overflow pipe spills to a surface water system, which eventually discharges to Galway Bay through the same outfall as that above for the Michael Collins Road CSO.

## **1.4 Laboratory Facilities**

The WWTP is operated by Earthtech Ireland Ltd. under a temporary Operation & Maintenance contract, with 24 hour supervision provided. Effluent flows and parameters are monitored, sampled and analysed on site, as detailed in Attachment E2. Sampling is carried out on a weekly basis by an Earthtech technician. Samples are analysed using industry accepted standard methods, with parameters tested including BOD, COD and Suspended Solids. For verification purposes samples are split and sent to an external laboratory.



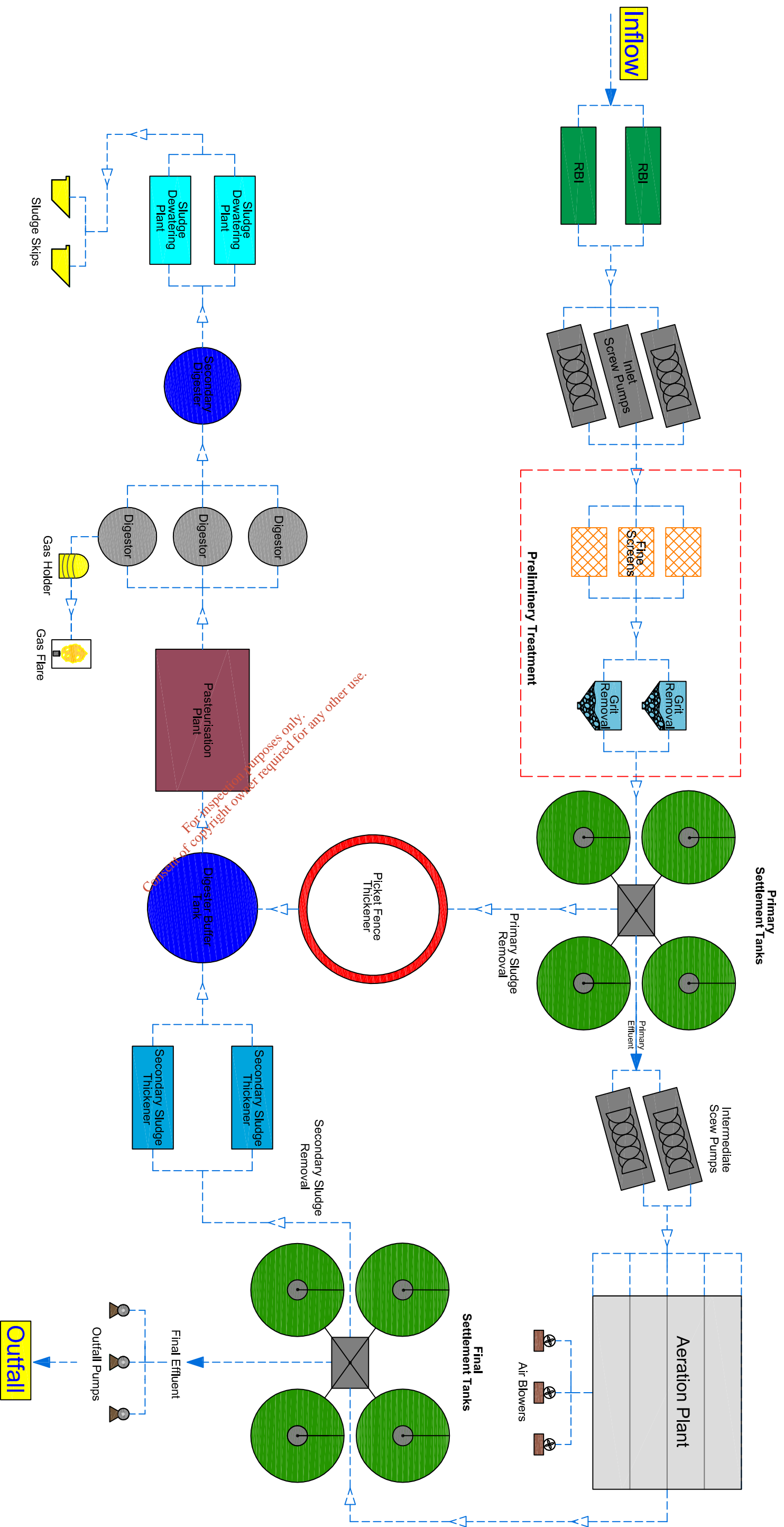
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